

**REMARKS**

Entry of the foregoing, reexamination and reconsideration of the above-identified application are respectfully requested.

Claims 1 and 2 have been amended to delete the recitation of "which has not previously been extracted." Claim 2 was also amended to delete the "2" which was inadvertently inserted in the last Amendment.

Claims 1, 2, 7-12 and 20-23 have been rejected under 35 U.S.C. §112, first paragraph, as allegedly containing subject matter not described in the specification. This rejection is now moot in view of the instant amendment. To expedite prosecution, the phrase "which has not previously been extracted" has been deleted. Withdrawal of this rejection is thus respectfully requested and believed to be in order.

Claims 1 and 2 have been rejected under 35 U.S.C. §102(b) as allegedly being anticipated by, or alternatively, under 35 U.S.C. §103(a) as allegedly being unpatentable over Ogasahara et al, U.S. Patent No. 5,264,236. This rejection is respectfully traversed.

As noted in the Official Action, Ogasahara et al teaches extraction pressures from 100-350 kg/cm<sup>2</sup>. By contrast, as recited in the instant claims, applicants' invention employs an extraction pressure of from 80 to 100 kg/cm<sup>2</sup>. Applicants found that by employing a lower extraction pressure, the essential oil components will be selectively extracted. *See, e.g.*, page 5, lines 11-22. Such a method employing the lower extraction pressure is neither disclosed nor suggested by Ogasahara et al. The method of Ogasahara et al thus will not produce hop extracts containing a large amount of specific essential oil

components which impart aroma to hops. Therefore, Ogasahara et al will not inherently produce a hop extract having the same amount of essential oil components.

Nor does Ogasahara et al teach or suggest a process for producing an essential oil-rich hop extract, having the steps of: (1) extracting hops with supercritical or subcritical carbon dioxide solvent at an extraction pressure of higher than 100 kg /cm<sup>2</sup> to obtain a carbon dioxide extract; (2) separating bitter components from the carbon dioxide extract at a pressure between 100 kg/cm<sup>2</sup> and said extraction pressure; and then (3) separating an essential oil-rich hop extract from the carbon dioxide extract at a pressure of 2 lower-than 100 kg/cm<sup>2</sup> .

Ogasahara et al does not teach a process employing each of these steps. Nor does the reference teach that by such a process, the ratio of essential oil content (ml) to  $\alpha$ -acid (g) in the extracted hops is increased by at least 2.

Ogasahara et al thus fails to disclose or even suggest the instantly claimed method. Withdrawal of this rejection is respectfully requested. Such action is believed to be in order.

Claims 1, 2 and 29 have been rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Haeffner et al. This rejection is respectfully traversed.

According to the Official Action, a *prima facie* case of obviousness exists because Haeffner allegedly teaches that optimization extraction conditions will have an effect on the composition of the final product. However, this teaching does not disclose or even suggest the claimed invention. While it may have been obvious to try different extraction pressures, obviousness to try is not the standard for obviousness. There is nothing in Haeffner et al to teach or suggest applicants' claimed process. The reference does not

suggest using an extraction pressure of 80-100 kg/cm<sup>2</sup> and recited in the instant claims to obtain a large amount of essential oil components. Nor does the reference teach a two-part process of (1) extracting hops with supercritical or subcritical carbon dioxide solvent at a pressure of 80 to 100 kg/cm<sup>2</sup> to obtain a carbon dioxide extract; and (2) separating an essential oil-rich hop extract from the carbon dioxide extract. Nor does the reference suggest that by using such a process, the ratio of essential oil content (ml) to  $\alpha$ -acid (g) in the extracted hops can be increased by at least 2.

Similarly, Haeffner et al fails to teach or suggest a process for producing an essential oil-rich hop extract, having the steps of: (1) extracting hops with supercritical or subcritical carbon dioxide solvent at an extraction pressure of higher than 100 kg /cm<sup>2</sup> to obtain a carbon dioxide extract; (2) separating bitter components from the carbon dioxide extract at a pressure between 100 kg/cm<sup>2</sup> and said extraction pressure; and then (3) separating an essential oil-rich hop extract from the carbon dioxide extract at a pressure of lower-than 100 kg/cm<sup>2</sup> . Nor does Haeffner et al teach that by such a process, the ratio of essential oil content (ml) to  $\alpha$ -acid (g) in the extracted hops is increased by at least 2.

· Haeffner et al thus does not render obvious applicants' claimed invention. The general teaching of modifying extraction conditions fails to teach the specifically claimed processes. Withdrawal of the rejection of record is thus respectfully requested. Such action is believed to be in order.

Claims 7-29 have been rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Ogasahara et al in view of Krasd Food. This rejection is respectfully traversed.

As stated *supra*, Ogasahara et al fails to disclose or suggest a process as instantly claimed wherein an extraction pressure of 80-100 kg/cm<sup>2</sup> is employed. Krasd Food allegedly discloses using the waste from a CO<sub>2</sub> extraction process along with the CO<sub>2</sub> extract in the production of wort. Krasd Food fails to overcome or remedy this deficiency of the Ogasahara et al reference. Krasd Food relates to the addition of a hop extract, etc., to wort. Krasd Food is unrelated to the production of an essential oil-rich hop extract and fails to teach the use of an extraction pressure of 80-100 kg/cm<sup>2</sup> in order to obtain a large amount of essential oil components in the hop extracts. The combination of references thus fails to teach a two-part process of (1) extracting hops with supercritical or subcritical carbon dioxide solvent at a pressure of 80 to 100 kg/cm<sup>2</sup> to obtain a carbon dioxide extract; and (2) separating an essential oil-rich hop extract from the carbon dioxide extract. Nor does the reference suggest that by using such a process, the ratio of essential oil content (ml) to  $\alpha$ -acid (g) in the extracted hops can be increased by at least 2.

Similarly, the combination of references fails to teach or suggest a process for producing an essential oil-rich hop extract, having the steps of: (1) extracting hops with supercritical or subcritical carbon dioxide solvent at an extraction pressure of higher than 100 kg /cm<sup>2</sup> to obtain a carbon dioxide extract; (2) separating bitter components from the carbon dioxide extract at a pressure between 100 kg/cm<sup>2</sup> and said extraction pressure; and then (3) separating an essential oil-rich hop extract from the carbon dioxide extract at a pressure of lower-than 100 kg/cm<sup>2</sup>. Nor does Haeffner et al teach that by such a process, the ratio of essential oil content (ml) to  $\alpha$ -acid (g) in the extracted hops is increased by at least 2.

This rejection of the claims is thus believed to be in error. Withdrawal of the rejection is respectfully requested and believed to be in order.

It is respectfully submitted that all rejections have been overcome by the above amendments. Thus, a Notice of Allowance is respectfully requested.

In the event that there are any questions relating to this amendment or the application in general, it would be appreciated if the Examiner would contact the undersigned attorney by telephone at (508) 339-3684 so that prosecution of the application may be expedited.

Respectfully submitted,

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**Attachment to Reply and Amendment dated May 30, 2002**

**Marked-up Claims 1-2**

1. (Five Times Amended) A process for production of an essential oil-rich hop extract, comprising the steps of:

- (1) extracting hops [which has not previously been extracted] with supercritical or subcritical carbon dioxide solvent at a pressure of 80 to 100 kg/cm<sup>2</sup> to obtain a carbon dioxide extract; and
- (2) separating an essential oil-rich hop extract from the carbon dioxide extract,

wherein the ratio of essential oil content (ml) to  $\alpha$ -acid (g) in the extracted hops is increased by at least 2.

2. (Six Times Amended) A process for production of an essential oil-rich hop extract, comprising the steps of:

- (1) extracting hops [which has not previously been extracted] with supercritical or subcritical carbon dioxide solvent at an extraction pressure of higher than 100 kg /cm<sup>2</sup> to obtain a carbon dioxide extract;
- (2) separating bitter components from the carbon dioxide extract at a pressure between 100 kg/cm<sup>2</sup> and said extraction pressure; and then
- (3) separating an essential oil-rich hop extract from the carbon dioxide extract at a pressure of [2] lower-than 100 kg/cm<sup>2</sup> ,

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**Marked-up Claims 1-2**

wherein the ratio of essential oil content (ml) to  $\alpha$ -acid (g) in the extracted hops is increased by at least 2.